



Docket No.: SON-3162
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Toshihiko Shirasagi, et al.

Application No.: 10/579,211

Confirmation No.: 6592

Filed: May 12, 2006

Art Unit: 1795

For: MANUFACTURING METHOD OF MASTER
DISC FOR OPTICAL DISC, AND MASTER
DISC FOR OPTICAL DISC

Examiner: A. L. Verderame

REPLY BRIEF

MS Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

INTRODUCTORY COMMENTS

This is a Reply Brief under 37 C.F.R. §41.41 in response to the Examiner's Answer mailed on August 3, 2010.

All arguments presented within the Appeal Brief of June 2, 2010 are incorporated herein by reference.

Additional arguments are provided hereinbelow.

Among others, the following positions were presented in the Examiner's Answer, each of which will be addressed in turn in this Reply Brief.

REMARKS

i. The Examiner erred in rejecting claims 1, 4-7, and 10 under 35 U.S.C. §103 as allegedly being unpatentable over Japanese Application Publication No. 2003-315998 (Kochiyama) in view of U.S. Patent No. 4,786,538 (Saito), U.S. Patent No. 4,916,048 (Yamada), and Japanese Application Publication No. 2001-344826 (Lee).

A. Claim 1, 6, 7 and 10 stand or fall together.

Claim 6 is dependent upon claim 1. Claim 1 is drawn to a manufacturing method of a master disc for an optical disc, comprising:

a film forming step of forming an inorganic resist layer (2) made of an incomplete oxide of a transition metal as a film onto a substrate (1) {Figure 1A}; and

a step of forming resist patterns including concave/convex shapes by exposing and developing said inorganic resist layer (2) {Figures 1B, 1C},

wherein in said film forming step, oxygen concentration of said inorganic resist layer (2) is made different in its thickness direction,

wherein said oxygen concentration is increased toward the surface of said substrate (1) from the surface of said inorganic resist layer (2).

Claim 10 is dependent upon claim 7. Claim 7 is drawn to a master disc for an optical disc which is used when the optical disc having concave/convex shapes is manufactured,

wherein a substrate (1) is coated with an inorganic resist layer (2) in which oxygen concentration is made different in its thickness direction and which is made of an incomplete oxide of a transition metal, and the concave/convex shapes are formed in said inorganic resist layer (2),

wherein said oxygen concentration is increased toward the surface of said substrate
(1) from the surface of said inorganic resist layer (2).

1. Japanese Application Publication No. 2003-315998 (Kochiyama).

a) Kochiyama fails to disclose, teach, or suggest *the oxygen concentration of said inorganic resist layer being increased toward the surface of the substrate from the surface of the inorganic resist layer.*

Page 6 of the Examiner's Answer is in agreement that the Final Office Action of November 4, 2009 fails to show within Kochiyama the presence of a method or product *wherein the oxygen concentration of said inorganic resist layer is increased toward the surface of the substrate from the surface of the inorganic resist layer.*

Here, the Examiner's Answer is in agreement that, individually, Kochiyama fails to disclose, teach, or suggest a method or product wherein *the oxygen concentration of an inorganic resist layer made of an incomplete oxide of a transition metal is increased toward the surface of a substrate from the surface of the inorganic resist layer.*

The combination of references will be addressed hereinbelow.

2. U.S. Patent No. 4,786,538 (Saito).

a) Saito fails to disclose, teach, or suggest an inorganic resist layer made of an incomplete oxide of a transition metal.

Page 6 of the Examiner's Answer is in agreement that Saito fails to disclose, teach, or suggest an inorganic resist layer made of an incomplete oxide of a transition metal.

Here, the Examiner's Answer is in agreement that, individually, Saito fails to disclose, teach, or suggest a method or product wherein *the oxygen concentration of an inorganic resist layer made of an incomplete oxide of a transition metal is increased toward the surface of a substrate from the surface of the inorganic resist layer.*

The combination of references will be addressed hereinbelow.

3. U.S. Patent No. 4,916,048 (Yamada).

Page 8 of the Examiner's Answer contends that *Yamada at least discloses an incomplete oxide of a transition metal at column 5 lines 21 through 24.*

In response, Yamada arguably discloses a second element of at least one, which is different from the first element, selected from the group of Te, Ge, Sn, Al, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Ga, Mo, Rh, Pd, Ag, Cd, In, Ta, W, Pt, Au, Tl, Pb, Si, Sb, Bi (Yamada at column 4, lines 60-64).

In addition, at least part of the second element exists in a non-oxide state (Yamada at column 5, lines 2-3).

However, Yamada is silent as to the second element being an incomplete oxide of a transition metal.

Individually, Yamada fails to disclose, teach, or suggest a method or product wherein *the oxygen concentration of an inorganic resist layer made of an incomplete oxide of a transition metal is increased toward the surface of a substrate from the surface of the inorganic resist layer.*

The combination of references will be addressed hereinbelow.

4. Japanese Application Publication No. 2001-344826 (Lee).

Page 11 of the Examiner's Answer is in agreement that Lee fails to disclose, teach, or suggest an inorganic resist layer made of an incomplete oxide of a transition metal.

Here, the Examiner's Answer is in agreement that, individually, Lee fails to disclose, teach, or suggest a method or product wherein *the oxygen concentration of an inorganic resist layer made of an incomplete oxide of a transition metal is increased toward the surface of a substrate from the surface of the inorganic resist layer*.

The combination of references will be addressed hereinbelow.

5. Combination of Kochiyama, Saito, Yamada, and Lee.

Rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness. *KSR International Co. v. Teleflex Inc.*, 82 USPQ2d 1385, 1396 (U.S. 2007).

Structural similarity between claimed and prior art subject matter, proved by combining references or otherwise, where the prior art gives reason or motivation to make the claimed compositions, creates a *prima facie* case of obviousness, and that the burden (and opportunity) then falls on an applicant to rebut that *prima facie* case. *In re Dillon*, 16 USPQ2d 1897, 1901 (Fed. Cir. 1990).

However, the mere fact that it is *possible* to find two isolated disclosures which might be combined in such a way to produce a new compound does not necessarily render such production obvious unless the art also contains something to suggest the desirability of the proposed combination. *In re Grabiak*, 226 USPQ 870, 872 (Fed. Cir. 1985).

Specifically, in cases involving new chemical compounds, it remains necessary to identify some reason that would have led a chemist to modify a known compound in a particular manner to establish prima facie obviousness of a new claimed compound. *Takeda Chemical Industries Ltd. v. Alphapharm Pty. Ltd.*, 83 USPQ2d 1169, 1174 (Fed. Cir. 2007).

The statutory standard of § 103 is whether the invention, considered as a whole, would have been obvious to one skilled in the art, not whether it would have been obvious to one skilled in the art to try various combinations. *Akzo, N.V. Aramide Maatschappij v.o.f. v. E.I. du Pont de Nemours*, 1 USPQ2d 1704, 1707 (Fed. Cir. 1987).

At least for the following reasons, the new ground of rejection fails to identify some reason that would have led a chemist to modify a known compound in a particular manner to establish prima facie obviousness of the new claimed compound.

Page 6 of the Examiner's Answer asserts that:

- ◆ Saito discloses the oxygen concentration of an inorganic resist layer being increased toward the surface of the substrate from the surface of the inorganic resist layer.
- ◆ Kochiyama discloses an inorganic resist layer made of an incomplete oxide of a transition metal.

In response, the Patent and Trademark Office determines the scope of claims in patent applications not solely on the basis of the claim language, but upon giving claims their broadest reasonable construction “in light of the specification as it would be interpreted by one of ordinary skill in the art”. *Phillips v. AWH Corp.*, 75 USPQ2d 1321, 1329 (Fed. Cir. 2005).

On the other hand, it is improper to read a limitation from the specification into the claims. *Liebel-Flarsheim Co. v. Medrad Inc.*, 69 USPQ2d 1801, 1806 (Fed. Cir. 2004).

In reversing the Board of Patent Appeals and Interferences, the U.S. Court of Appeals for the Federal Circuit explained the following within *In re Suitco Surface Inc.*, 94 USPQ2d 1640, 1644 (Fed. Cir. 2010):

The broadest-construction rubric coupled with the term “comprising” does not give the PTO an unfettered license to interpret claims to embrace anything remotely related to the claimed invention. Rather, claims should always be read in light of the specification and teachings in the underlying patent. See Schriber-Schroth Co. v. Cleveland Trust Co., 311 U.S. 211, 217 [47 USPQ 345] (1940) (“The claims of a patent are always to be read or interpreted in light of its specifications.”).

It is axiomatic that claim language should be read in light of the specification as it would be interpreted by one of ordinary skill in the art. *In re Bond*, 15 USPQ2d 1566, 1567 (Fed. Cir. 1990).

The specification is the single best guide to the meaning of a disputed term. *In re Translogic Technology Inc.*, 84 USPQ2d 1929, 1935 (Fed. Cir. 2007).

Here, the specification for the application on appeal provides the following at page 5, lines 8-17:

The incomplete oxide of the transition metal mentioned here denotes a compound whose oxygen content is deviated in the direction in which it is smaller than that of the stoichiometric composition according to a valence number which the transition metal can have, that is, a compound in which the oxygen content in the incomplete oxide of the transition metal is smaller than the oxygen content of the stoichiometric composition according to the valence number which the transition metal can have.

Prior art references may be indicative of what all those skilled in the art generally believe a certain term means and can often help to demonstrate how a disputed term is used by those skilled in the art. *In re Cortright*, 49 USPQ2d 1464, 1467 (Fed. Cir. 1999).

Here, the machine translation of Kochiyama from the European Patent Office website (espacenet.com) provides the following:

[0033] The resist material according to the present invention is an *incompletely oxidized transition metal*. Herein the incompletely oxidized transition metal is *defined as a compound having an oxygen content deviated to a lower content from the stoichiometric oxygen content corresponding to a possible valence of the transition metal*. In other words, the incompletely oxidized transition metal is *defined as a compound having an oxygen content lower than the stoichiometric oxygen content corresponding to a possible valence of the transition metal*.

[0034] The oxidized transition metal will now be exemplified by chemical formula MoO_3 . When the oxidation state of the chemical formula MoO_3 is represented by composition $\text{Mo}_{1-x}\text{O}_x$, $x=0.75$ indicates a complete oxide whereas $0 < x < 0.75$ indicates an incomplete oxide having an oxygen content lower than the stoichiometric oxygen content.

[0035] Some transition metals can form oxides with different valences. For such metals, the present invention is limited to incompletely oxidized transition metals having an actual oxygen content lower than the stoichiometric oxygen content corresponding to the possible valences of the transition metals. For example, molybdenum oxide is most stable in the trivalent state (MoO_3) described above, and can also be present in the monovalent state (MoO). When MoO is represented by composition $\text{Mo}_{1-x}\text{O}_x$, $0 < x < 0.5$ indicates an incomplete oxide having an oxygen content lower than the stoichiometric oxygen content. The valences of the transition metal oxides can be analyzed with commercially available analytical instruments.

a) **Kochiyama regarding the oxygen concentration of an inorganic resist layer.**

Page 6 of the Examiner's Answer is **in agreement** that the Final Office Action of November 4, 2009 **fails** to show within Kochiyama the presence of a method or product *wherein the oxygen concentration of said inorganic resist layer is increased* toward the surface of the substrate from the surface of the inorganic resist layer.

b) **Saito regarding the oxygen concentration of an inorganic resist layer.**

Regarding Saito, page 6 of the Examiner's Answer is **in agreement** that Saito **fails** to disclose, teach, or suggest an inorganic resist layer **made of an incomplete oxide of a transition metal**.

Likewise, a review of Saito reveals that reference as being **silent** as to the presence of any incomplete oxide.

c) **Yamada regarding the oxygen concentration of an inorganic resist layer.**

Regarding Yamada, this reference **fails** to disclose, teach, or suggest the presence of any incomplete oxide at least for the following reasons.

There is no suggestion to combine if a reference **teaches away** from its combination with another source. *Tec Air, Inc. v. Denso Mfg. Mich. Inc.*, 52 USPQ2d 1294, 1298 (Fed. Cir. 1999).

A reference may be said to teach away when a person of ordinary skill, upon reading the reference, **would be discouraged** from following the path set out in the reference, or would be led in

a *direction divergent* from the path that was taken by the applicant. *In re Gurley*, 31 USPQ2d 1130, 1131 (Fed. Cir. 1994).

Here, Yamada arguably discloses the following beginning at column 4, line 59:

This photosensitive layer 12 comprises

a *first element* selected from a group of metals or semimetals,

a *second element* of at least one, which is different from the first element, selected from the group of Te, Ge, Sn, Al, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Ga, Mo, Rh, Pd, Ag, Cd, In, Ta, W, Pt, Au, Tl, Pb, Si, Sb, Bi, and

an *oxygen element*, wherein at least part of the oxygen element is *bonded with the first element to form its oxide*, and the ratio x of the total number of atoms of the oxygen element to that of first element, *assuming the maximum valence of the first element in a stable oxide state to be n* , satisfies the relation of $0 < x < n/2$.

Examples of the first element may include Te, Sb, Bi, Si, Ge, Sn, Pb, In, Tl, *Mo and W* (Yamada at column 5, lines 4-5).

Nevertheless, paragraph [0033] of Kochiyama provides that the incompletely oxidized transition metal is *defined as a compound having an oxygen content lower than the stoichiometric oxygen content corresponding to a possible valence of the transition metal*.

Conversely, Yamada refers to “the *maximum valence of the first element in a stable oxide state*” (Yamada at column 4, line 68 to column 5, line 2).

As a consequence, Yamada *teaches away* from an incomplete oxide of a transition metal.

d) Lee regarding the oxygen concentration of an inorganic resist layer.

Page 11 of the Examiner's Answer is in agreement that Lee fails to disclose, teach, or suggest an inorganic resist layer made of an incomplete oxide of a transition metal.

6. Concluding.

Either individually or as a whole, Kochiyama, Saito, Yamada, and Lee fails to disclose, teach, or suggest a method or product wherein the oxygen concentration of an inorganic resist layer made of an incomplete oxide of a transition metal is increased toward the surface of a substrate from the surface of the inorganic resist layer.

B. Claims 4 and 5 stand or fall together.

Claim 5 is dependent upon claim 4. Claim 4 is drawn to a manufacturing method of the master disc for the optical disc according to claim 1, wherein

a single element or alloy of the transition metal, or an oxide of them is used as a target material,

said inorganic resist layer is formed as a film onto the substrate by a sputtering method using oxygen or nitrogen as a reactive gas, and

the oxygen concentration of said inorganic resist layer is made different in the thickness direction by changing at least either a film forming power or a reactive gas ratio.

1. Arguments incorporated by reference.

For the purpose of brevity, the arguments presented hereinabove with respect to claim 1 are incorporated by reference.

Additional arguments are presented hereinbelow.

2. Japanese Application Publication No. 2003-315998 (Kochiyama).

Page 6 of the Examiner's Answer is in agreement that the Final Office Action of November 4, 2009 fails to show within Kochiyama the presence of a method or product *wherein the oxygen concentration of said inorganic resist layer is increased* toward the surface of the substrate from the surface of the inorganic resist layer.

Moreover, page 9 of the Examiner's Answer readily admit that Kochiyama et al. does not disclose *varying the oxygen content in the film so that the oxygen concentration is increased toward the surface of said substrate*.

Page 14 of the Examiner's Answer readily admit that Kochiyama does not disclose the oxygen concentration of the inorganic resist layer being made different in the thickness direction by changing at least either a film forming power or a reactive gas ratio.

Page 14 asserts the following:

Despite the fact that the inorganic resist formed has a constant degree of oxidation, based on this disclosure one of ordinary skill in the art would recognize that formation of a film having varying degree of oxidations could be done by controlling the oxygen content in the atmosphere while employing a sputtering method.

In response, this assertion is conclusory and hindsight at best being in the absence of any objective supporting evidence.

3. U.S. Patent No. 4,786,538 (Saito).

Page 7 of the Examiner's Answer asserts the following:

The examiner points out that the appellant's dependent claim 4 allows for "...a single element or alloy of the transition metal. .. " to be used as the target material. A target material for forming the MoTeOx film envisioned above would arguably contain MoTe. Target sputtering in an O₂/Ar atmosphere as taught in Kochiyama et al. at 0045 or 0084 can be used. Alternatively, a plasma method as described at column 8 lines 45 through 63 of Saito can be used.

Page 9 of the Examiner's Answer asserts the following:

Kochiyama et al. does not disclose varying the oxygen content in the film so that the oxygen concentration is increased toward the surface of said substrate. This feature is taught by Saito. Saito relates to an optically sensitive sub-oxide film. Though Te is not a transition metal, TeOx is still an optically sensitive sub-oxide film like those taught by Kochiyama. Further, a MoTeOx film would be immediately envisioned based on the disclosure in Saito at column 4, lines 7-9 as argued above. Benefits of adjusting the oxygen concentration in the film which include increased adhesive properties between substrates and layers, increased sensitivity, and increased stability are disclosed in Saito (see abstract). Example 5 discloses a film where the oxygen concentration is increased toward the substrate surface from the surface of the photoresist.

In response, Kochiyama is silent as to a "telluride target" in a sputtering method.

Regarding Saito, that reference itself is silent as to the presence of a sputtering method.

In the absence of a sputtering method within Saito, Saito fails to disclose, teach, or suggest the oxygen concentration of an inorganic resist layer being made different in the thickness direction during the sputtering method of Kochiyama.

To account for this deficiency within Saito, page 16 of the Examiner's Answer asserts the following:

Instead the office action would use the method disclosed by Kochiyama to form a film having varying oxygen content like that taught in Saito because Kochiyama describes that different oxidation can be achieved simply by varying the amount oxygen/reactive gas present in the atmosphere during the sputtering process.

In response, Kochiyama arguably discloses the following:

[0045] A resist layer of an incompletely oxidized transition metal is deposited on a sufficiently smooth surface of a substrate. Depositing methods include, for example, sputtering in an argon-oxygen atmosphere using a sputtering target of an elemental transition metal. This method can control the degree of oxidation of an incompletely oxidized transition metal by changing the concentration of oxygen gas in a vacuum atmosphere. An incompletely oxidized transition metal containing two or more kinds of transition metals may be deposited by sputtering while the substrate is constantly rotated over different kinds of sputtering targets to mix the different transition metals. The individual charging powers of the sputtering targets can be changed to control the mixture ratio.

Nevertheless, Kochiyama fails to disclose, teach, or suggest the *oxygen concentration of the incompletely oxidized transition metal being made different in the thickness direction by changing the concentration of oxygen gas in a vacuum atmosphere.*

4. U.S. Patent No. 4,916,048 (Yamada).

Yamada arguably discloses that the thin film photosensitive layer 12 is formed on the base 11 by a vacuum deposition or sputtering method (Yamada at column 4, lines 57-58).

Yamada arguably discloses the following beginning at column 22, line 3:

The following examples relates to production of a thin film by a sputtering method. FIG. 18 is a plan of a disc shaped target 4 inches in diameter and 5 mm in thickness used in the sputtering process. A target main body 158 is composed of TeO₂ of which sector plates of Te 160 and Sn 162 are arranged at a surface area ratio of TeO₂:Te:Sn equal to 2:2:1. In this state, sputtering was continued for 10 minutes in an argon Ar gas atmosphere, and a pale brown colored thin film was obtained. When this film was irradiated with a semi-conductor laser beam with a wavelength of 830 nm for 500 nsec at an irradiating power density of 0.8 mW/μm², the irradiated portion was blackened. When this blackened portion was irradiated for 50 nsec at a power density of 7 mW/μm², the irradiated portion returned to an original pale color state.

As argued on page 18 of the Appellant's Brief, Yamada fails to disclose, teach, or suggest the oxygen concentration of an inorganic resist layer is made different in the thickness direction by changing at least either a film forming power or a reactive gas ratio.

No rebuttal to this argument is present within the Examiner's Answer.

5. Japanese Application Publication No. 2001-344826 (Lee).

Page 17 of the Examiner's Answer is in agreement that Lee fails to disclose, teach, or suggest is silent as to the presence of a sputtering method.

6. Concluding.

Either individually or as a whole, Kochiyama, Saito, Yamada, and Lee fail to disclose, teach, or suggest a method wherein the oxygen concentration of said inorganic resist layer is made different in the thickness direction by changing at least either a film forming power or a reactive gas ratio.

CONCLUSION

The prior art of record fails to disclose, teach or suggest all the features of the claimed invention.

For the foregoing reasons, all the claims now pending in the present application are allowable, and the present application is in condition for allowance. For at least the reasons set forth hereinabove, the rejection of the claimed invention should not be sustained.

Therefore, a reversal of the rejection is respectfully requested.

If any additional fee is required or any overpayment made, the Commissioner is hereby authorized to charge the fee or credit the overpayment to Deposit Account # 18-0013.

Dated: September 24, 2010

Respectfully submitted,

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